Appendix

Table of Contents

Action Checklist

Name_____ **Job #** _____

Address _____ **Date** _____

_____ **Inspector** _____

100. FLOOD

- 101. Retrofit your well to reduce contamination ☐
- 102. Maintain storm drains on your property ☐
- 103. Install a gas safety cut-off valve ☐
- 104. Anchor and elevate fuel tanks & AC units ☐
- 105. Anchor your home ☐
- 106. Apply protective sealant to your walls ☐
- 107. Install a septic backflow preventer ☐
- 108. Consider wetproofing options ☐
- 109. Install interior or exterior flood walls ☐
- 110. Relocate or elevate internal appliances ☐

200. WIND

- 201. Reduce potential for flying debris ☐
- 202. Anchor the base of your manufactured home ☐
- 203. Bolt your house sill plate connection ☐
- 204. Increase your gable end bracing ☐
- 205. Replace gable vent with slotted vent ☐
- 206. Fasten your roof & walls - hurricane straps ☐
- 207. Improve the securing of your roof sheathing ☐
- 208. Improve closure of your windows and doors ☐
- 209. Create a safe area in your home ☐
- 210. Improve the bracing of your "A" frame roof ☐

300. EARTHQUAKE

- 301. Install a gas safety cut-off valve ☐
- 302. Brace your manufactured home ☐
- 303. Bolt your house sill plate connection ☐
- 304. Brace your cripple walls ☐
- 305. Brace your masonry chimney ☐
- 306. Use flexible connections for gas and water ☐
- 307. Strap your water heater ☐
- 308. Secure your light home contents ☐
- 309. Secure your furniture ☐
- 310. Improve the securing of your wall sheathing ☐

400. FIRE

- 401. Create a firebreak around your property ☐
- 402. Relocate or protect your exterior fuel tanks ☐
- 403. Maintain your gutters & clear roof of debris ☐
- 404. Cover openings with fine mesh ☐
- 405. Use fire resistant materials on your home ☐
- 406. Install outside spigots ☐
- 407. Install smoke & carbon monoxide detectors ☐
- 408. Provide fire extinguishers in your home ☐
- 409. Install a spark arrester on your chimney ☐
- 410. Keep your chimney clean ☐

Notes: _____

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- 410. Keep your chimney clean ☐

Notes: _____

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Appendix B : Cost Estimates for the Fact Sheet mitigation measures

Material costs were developed using RS Means and estimates from selected home improvement stores. Labor costs were estimated based on a ratio to material cost of 1:1 that is used for WAP. In unique situations where machinery and crew labor is required a greater multiplier times materials was utilized.

FLOOD

Mitigation Measure	Description of Mitigation Measure	Estimated Cost		
		Materials	Labor	Total
101	Install gasketed well head cover with bolts	$100-$150	$100-$150	$200-$300
102	Clean gutters and storm drains and purchase and install gutter guard	$35-$50	$70-$100	$100-$150
103	Install gas safety cut-off valve to interior gas line	$200-$250	$150-$250	$350-$500
104	Anchor/elevate external fuel and Air Conditioning units	$300-$400	$300-$400	$600-$800
105	Anchor homes to foundation	$80-$100	$160-$200	$240-$300
106	Apply protective sealants to exterior and below-grade walls	Sealant $700-$800 for 240 sq. ft. Metal flood shields $73 per sq. ft. Wood shields $23 per sq. ft.	$100-$800	$200-$1,600
107	Buy and install septic backflow valve	$100-$300	$300-$900	$400-$1,200
108	Buy and install floating drain plug in first floor	$30-$40	$60-$80	$90-$120
109	Build interior walls around critical utilities	3-ft. high wall with a 35-ft. perimeter $300-$500; Submersible pump $60-$100	$200-$500	$300-$1,000
110	Move internal utilities/appliances to another floor or elevate in-place requiring an electrician and laborers for the heavy lifting	$50-$140	$500-$1,000	$600-$1,100

WIND

Mitigation Measure	Description of Mitigation Measure	Estimated Cost		
		Materials	Labor	Total
201	Trim, prune, and/or remove tree limbs and whole trees [Reduce potential for flying debris (i.e., anchor sheds, equipment, and miscellaneous materials)]	No materials needed-only tree professional service	$300-$500	$300-$500
202	Buy and install galvanized metal plating or strapping to secure home to foundation	$5.00-$7.00 for 50 ft. ($250-$300)	$250-$300	$500-$600
203	Uncover wall framing in order to screw or otherwise attach frame to foundation of regular or non-manufactured homes	$125-$175	$250-$350	$375-$525
204	Install 2x4s to brace end gables, galvanized fasteners to further secure the gables, and 16d nails or screws	$30-$40	$45-$60	$75-$100
205	Install slotted or power vents to replace older gable vents	$150-$200	$150-$200	$300-$400
206	Install hurricane straps in order to fasten the roof to the home walls	$40-$120	$100-$300	$140-$420
207	Install 16d nails to improve securing of sheathing to roof. High-strength adhesive AFG01	$30-$50	$100-$200	$130-$250
208	Add or replace door bolts and add or replace door hinges Apply impact resistant safety film to windows.	Door- $10 to $40; Adding safety coating to glass: $5.00 per sq. ft.	Door- $10-$40; Safety Film- $100-$200	$20-$300
209	Create a safe area within your home to protect people	$250-$500	$250-$500	$500-$1,000
210	Install 2x4s to brace trusses of A frame homes	$40-$50	$60-$75	$100-$125

EARTHQUAKE

Mitigation Measure	Description of Mitigation Measure	Estimated Cost		
		Materials	Labor	Total
301	Install gas safety cut-off valve to interior gas line	$200-$250	$150-$250	$350-$500
302	Install bracing for a manufactured home	$5.00-$7.00 for 50 ft. ($250-$300)	$250-$300	$500-$600
303	Install metal plates and bolt to connect house sill plate to foundation	$125-$225	$250-$450	$375-$675
304	Brace cripple walls with rebar and grout for masonry units and extra courses of brick?	$200-$350	$400-$700	$600-$1,050
305	Install steel straps and angle bracing to go around chimneys and bolt the non free standing straps to the exterior walls	$500-$800	$500-$800	$1,000-$1,600
306	Install flexible piping for appliances and utilities. Buy and install angle bracing for overhead pipes	$75-$300	$50-$100	$125-$400
307	Install steel straps to strap the water heater to wall studs or concrete anchors for masonry walls.	$80-$100	$80-$100	$160-$200
308	Install lengths of heavy to medium strength chains and bolt them around propane type fuel tanks, or buy lightweight chains for counter top appliances or TVs, or buy steel straps to anchor wood stove flues and bolts to bolt wood stoves to the floor	$20-$50	$20-$50	$40-$100
309	Install bolts and brackets to bolt down bookcases and steel bands to keep shelf contents from sliding off	$5-$15	$10-$30	$15-$45
310	Improve or secure wall sheathing	$125-$175	$250-$350	$375-$525

FIRE

Mitigation Measure	Description of Mitigation Measure	Estimated Cost		
		Materials	Labor	Total
401	Hire two landscape professionals for removing vines from walls and creating a zone around the home free of underbrush and dead leaves	N/A	$100-$150	$100-$150
402	Relocate/Protect exterior, above-ground fuel tank(s) and reconnect the service lines	$100-$150	$300-$450	$400-$600
403	Maintain gutters, eaves, and clear roof of leaves and woody debris	N/A	$70-$100	$70-$100
404	Install non-flammable, or replace flammable, window and door screens with ½-inch or less screening mesh	$25 for windows, $75 for doors,	$50-$75	$70-$150
405	Replace existing roofing material with tile, metal, or slate roofing (cost are averages based upon roof area and are all inclusive)			$4 per square foot for tile or metal roofing, $7 per square foot for slate
406	Spigot and 10 ft. Copper piping Nozzle and 100 ft. Hose	$40-$50	$80-$120	$120-$170
407	Buy and install smoke and carbon monoxide detectors; to hard wire one in-place, an electrician is needed	$5-$40	$25-$50	$30-$90
408	Install 1 fire extinguisher	$20-$60	$10-$15	$30-$75
409	Install a chimney spark arrester, hire a tree professional to trim/cut tree limbs and branches to keep them a safe distance from the chimney opening	$30-$50	$50-$150	$80-$200
410	Clean chimney (only the service required)	N/A	$60-$65 brush cleaning, $250 -$500 mechanical cleaning	$60-$500

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Seismic Retrofit Training for Building Contractors & Inspectors: ideas, text, pictures, cost, suggested funding agencies for earthquake related mitigation

Money for Mitigating Earthquake Hazards

Map of USGS Earthquake Zones take from…
URL:http://www.geohazards.cr.usgs.gov/eq/graphics/usmap.pdf

For information about your specific locality, see also:
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Appendix D: Unit Questions and Answers

Unit 2: Identify the Hazards

1. What does darker shading indicate?
A. Greater risk

2. On the top map, what do the numbers in the middle of the blocks mean?
A. They indicate the panel that shows detail of that area.

Identify on Pp. 10-11:
3. The meaning of the numbers "8, 9, and 10" beside the wavy lines
A. They indicate the base flood elevation level in feet at the marked areas. Because the elevation varies along the watercourse, each number beside a wavy line is an interpolation from the cross section readings, not a directly measured reading.

4. The areas:
A. At greatest risk - those with darker shading, especially Zones AE, the floodway and between EL 8 and EL 9, and VE, EL 9

B. At less risk - The lighter tinted areas: Zone X

C. At minimal risk - Zone X unshaded

D. At unknown risk - Tricky question because Zone D is not shown on this map; however, Zone X unshaded is also unknown because the map does not indicate land contours.

5. The meaning of the hatched lines in the Hackberry Draw and the consequences for a resident whose home is there
A. The hatched lines (P. 14) mean the home is in the floodway area, so the home is at high risk of flooding or severe damage.

6. The risk to Zone X areas at the top left which are untinted vs. those also in Zone X which are tinted
A. The risk to the untinted zone is indeterminate because the map does not show land contours; the tinted zone is in the 500-year floodplain, or the 100-year floodplain with risk of flooding up to a foot, or an area protected by a levee.

7. A Coastal Barrier area
A. Zone VE (bottom center) with the cross-hatching.

8. The risk associated with the area left of the marked "Limit of Floodway"
A. It is marked Zone AE, EL 8, so the risk to 8 feet elevation is high.

Unit 2: Identify the Hazards - Continued

9. How do you get a FIRM?
A. P. 2: You can look at a map at your local community map repository site, such as your local planning, zoning or engineering office. You can also order a FIRM from FEMA. (P. 20 explains the procedures.)

10. Is a FIRM free?
A. P. 20 No, there is a nominal fee.

11. If you want flood risk information for a large city or county, how many maps will you need? How can you find out?
A. P. 20 Review the current Flood Map on file at your local community map repository; request from FEMA a copy of the Flood Map index to identify the panels you need.

12. What is the date of the map's information?
A. 1998

13. What does the 6-digit number "370168" signify?
A. The community's number

14. What do the numbers after that 6-digit number signify?
A. The panel number

15. What number do you need for the map showing Routes 40 and 17, the Murrayville and Kings Grant Tributaries and Pages Creek?
A. 370168 0045 E

16. What is its date?
A. 1992

17. Is the NFIP available for residents in this area?
A. At the bottom of each FIRM is information about how to find out if this program is available in this community.

18. For Murrayville Road at the left edge (middle) of the map. If there are any homes on that road in the floodplain, are some at greater risk than others?
A. The road runs through Zones C unshaded, B and A. The homes in Zone A in the 100-year floodplain are at high risk; those in Zone B, the 500-year floodplain, are at medium risk. In Zone C unshaded, outside the 500-year floodplain, the risk is indeterminate because the map does not show land contours. You can assess the risk only after visiting the property.

19. Find location 1 on the map. What is its hazard?
A. It's in Zone B, the 500-year floodplain, so its risk is medium.

Unit 2: Identify the Hazards – Continued

20. What about the hazard for location 2
A. It's in Zone A, so has high risk.
21. What is the hazard for location 3, in the upper middle section of the map, in Zone C, far from marked flood zones? Can you safely assume that site is safe from flooding?
A. No, every area faces potential flooding. Also, the map does not show topography; this area could be a plain where water could back up or contain a creek or underground stream. You can assess the risk only after visiting the property.

22. What is the hazard for location 9? Because the surrounding areas are designated Zone A10, EL 11, can you assume location 9 is fairly safe because it is marked Zone C?
A. No, because you do not know exactly how far above the floodplain they are. Everyone is at risk for flooding, so homeowners should buy flood insurance. You can assess the risk only after visiting the property.

23. Location 5
A. Location 5 is in Zone C unshaded. Its risk is the same as for location 3.

24. Location 7
A. Location 7 is in Zone C unshaded. Its risk is the same as for location 3.

25. Location 8
A. Location 8 is in Zone C unshaded. Its risk is the same as for location 3.

26. Location 10
A. Location 8 is in Zone C unshaded. Its risk is the same as for location 3.

27. What effect does the hatching have on the orange section in western Virginia and North Carolina?
A. The map does not indicate what additional risk is added. Because the section is orange, you might assume the risk level is medium high, with additional information about the specific kind of risk noted.

28. What is the wind risk in Tulsa, OK?
A. Red indicates high risk.

29. What is the wind risk in Kansas City, MO?
A. Red indicates high risk.

30. What is the wind risk in Oakland, CA?
A. White indicates low risk.

31. What is the wind risk in Wilmington, NC?
A. Orange indicates medium risk, and it is in a hurricane-susceptible region.

Unit 2: Identify the Hazards – Continued

32. What is the earthquake risk in Tulsa, OK?
A. Blue indicates low risk.

33. What is the earthquake risk in Kansas City, MO?
A. White indicates low risk.

34. What is the earthquake risk in Oakland/San Francisco, CA?
A. Red indicates high risk.

35. What is the earthquake risk in Wilmington, NC?
A. It seems to be medium because the color is green, but it could be low because the blue is very near.

36. What is the fire risk in Tulsa?
A. Medium (8 months)

37. What is the fire risk in Kansas City, MO?
A. Medium (5 months)

38. What is the fire risk in Oakland/San Francisco, CA?
A. Low (2 months)

39. What is the fire risk in Wilmington, NC?
A. Medium (9 months are colored, but two are yellow, so the tally is 8)

Unit 3: Recognize the Risks and Mitigation Measures

Answers for the exercises are included in the unit.

Unit 4: Integrate Cost Information and the WAP

1. Which risks are highest for **Tulsa?**

A. Wind and fire (The Relative Risk Levels Table shows Tulsa has high risk for wind and medium for fire, but low for flood and earthquake.)

On your Action Checklist for the hazards you checked:

2. What would be the total cost to implement all those measures? Include any donated services/materials available.

A. Answers will vary.

3. Does the total cost exceed your budget?

A. Answers will vary.

4. Which risks are highest for **Kansas City**?

A. Flood and wind (The Relative Risk Levels Table shows Kansas City has high risk for flood and wind, but low for earthquake and medium for fire.)

On your Action Checklist for the hazards you checked:

5. What would be the total cost to implement all those measures? Include any donated services/materials available.

A. Answers will vary.

6. Does the total cost exceed your budget?

A. Answers will vary.

7. Which risks are highest for **SF/Oakland**?

A. Earthquake (The Relative Risk Levels Table shows SF/Oakland has high risk for earthquake, but low for flood, wind and fire.)

On your Action Checklist for the hazards you checked:

8. What would be the total cost to implement all those measures?

A. Answers will vary.

9. Does the total cost exceed your budget?

A. Answers will vary.

10. How will you determine where to concentrate your recommendation when the relative risk rankings are very similar?

A. Look for the most effective benefits, using the criteria to protect first against risk to life and then to property. For property, emphasize enhancing the building integrity of the home, except for fire, when you need to emphasize keeping fire away from the home.

Unit 4: Integrate Cost Information and the WAP – Continued

On your Action Checklist for all four hazards:

11. What is the total cost to implement all your recommended measures?

A. Answers will vary. Choosing any mitigation measures that you checked on your Unit 3 Action Checklist is correct.

12. Does the total cost exceed your budget?

A. Answers may vary.

Final Exercise

13. What mitigation measures will you recommend for this home? (In Wilmington, NC)

A. Because flood has the only "high" rating, recommendations should focus on that hazard.

14. Why?

A. Answers may vary, but the recommendations must be:

- Among the flood mitigation measures checked on the Action Checklist from Unit 3
- Adhere to budget guidelines
- Maximize the programs' effectiveness to benefit homeowners

Appendix E : Instructor Information

Target Audience

The target audience for this FEMA training is the State Energy Monitors. The State is responsible for the rollout to the CAGs in conjunction with the existing Weatherization Assistance Program (WAP) course.

Course Duration

The course content requires about six and a half-hours if all four hazards are included. Breaks and lunch are in addition. Explanation of time shown in left column.

Class Size

There will be a maximum of 20 students per class to encourage maximum participation and discussion with practice and feedback.

Instructor/Facilitator Qualifications

Instructors must be knowledgeable about various kinds of risks to homes posed by flood, wind, earthquake and fire as well as appropriate mitigation measures for those risks and be skilled facilitators. They should also know how to determine the relative risks for each of the targeted natural hazards and be able to identify potential hazards and appropriate mitigation measures. During training, monitors need to tell the CAG inspectors the base flood elevations of the properties they will be inspecting.

Before delivering training to the CAG inspectors, monitors need to find out various kinds of information, such as what kinds of hazards may be present for the locality and homes to be inspected, what building codes apply, and what permits are needed (if any). See below for a complete checklist of the applicable issues and required information.

Course Structure/Strategy

The course uses a facilitator to lead participants though skills such as how to determine the relative threats from flood, wind, earthquake and wildfire for their local area. Although the course content includes four major hazards, State Energy Monitors training CAGs may omit sections according to local needs.

Participants will learn to read a Flood Insurance Rate Map (FIRM) and use maps illustrating risks from wind, earthquakes and fire as well as use the Action Checklist, which may be a job-aid during and after inspections.

Interactive discussions and exercises will challenge participants to identify hazards and appropriate mitigation measures for protecting life, enhancing safety and reducing potential damage to a home. The practice exercises use visuals that show conditions

participants may encounter during inspections. Participants are encouraged to use their existing knowledge, common sense and initiative.

Learning assessments verify that Inspectors are able to identify the relative risks of natural hazard events and recognize the risks they pose to a home. There are also assessments of participants' abilities to calculate the costs of appropriate mitigation measures, assess how to integrate the WAP and other possible resources, and how to maximize the effectiveness of the program for the homeowner. Unit and cumulative reviews reinforce the content.

Course Materials

Course materials include:

- The *Hazard Identification and Mitigation Training Manual*
- The Action Checklist
- The National Cost Codes Handout
- Guide to Flood Maps, FEMA 258/May 1995
- Flood Rate Insurance Maps (FIRM) for this locality – one for each participant and facilitator
- Detailed earthquake zone map for this locality, as needed
- 1 Easel and pad
- Magic markers
- Pens
- Highlighters
- Name Tags and Name Tents for each participant and facilitator
- Tables/chairs

Issues for Instructor to resolve before training:

1. What kinds of hazards threaten the locality and homes to be inspected, and their relative risks

2. What building codes apply, and what permits are needed (if any)

3. Estimated local costs for implementing the proposed mitigation measures

4. The minimum standards for materials for work being recommended (Inspectors' recommendations must be for mitigation, not beautification.)

5. What monies are available from various sources to fund the mitigation measures, especially donations of money and/or materials? What, if any, limitations are there on their use?

6. Is there an expected average amount an Inspector can spend on mitigation measures for each home? If so, what are the guidelines from the WAP Administrator?

7. How much leeway does an Inspector have to exceed that expected average, by what amount(s), and what substantiation/justification is required?

8. Should Inspectors recommend mitigation measures for houses in the floodplain/coastal barrier areas, or will they be excluded? If they are included, will the have special treatment, such as more/less funding, only funding for flood mitigation measures, or something else?

9. Will money be used for mitigation measures to a home if its risk from a potential disaster is only medium or low when many other homes in the area have only high risk, and all the available money could be spent on those high risk homes?

10. Will the emphasis be on meeting the needs/doing something for every resident whose home is inspected or doing more for the homes at greatest risk?

11. Talking to the homeowner:

- How much information about the recommendations should the Inspector provide?

- How much additional information to provide about the NFIP, such as the current cost of premiums in your locality

Specific Data:

- Base flood elevations of the homes Inspectors will be assessing

- Local building codes and required permits

- Local costs of materials and labor

Appendix F : Flood Insurance Documentation

National Flood Insurance Program Fact Sheet

National Flood Insurance Program Website Cost Information

Flood Insurance Slide Show

Flood Insurance Rate Maps

FEMA Guide to Flood Insurance Rate Map

The National Flood Insurance Program (NFIP)

The National Flood Insurance Program is a federal plan which enables property owners in participating communities to buy affordable insurance protection against losses from flooding. Its benefits include putting you in control of managing your risks and greatly speeding your recovery after a flood. Even after floodproofing your home, you still need insurance to protect you from unexpected events like a flood rising higher than your protected level. Homeowners' policies do not cover flood damage, so you need to purchase a separate policy under the **National Flood Insurance Program (NFIP).** NFIP covers almost all kinds of homes, including a manufactured home affixed to a permanent site and properly anchored.

Although an NFIP policy does NOT cover all kinds of damage, it does cover:

- ✓ Damage to your home and/or its contents caused by surface water flooding (up to the amount of your coverage)
- ✓ Costs for moving and storing your belongings for up to 45 days (up to the amount of the minimum deductible)
- ✓ Expenses for removing debris left by the flood

Types of coverage include:

- Building coverage. You can buy insurance which covers your home's structure (walls, floors), insulation, wall-to-wall carpeting, furnace, and other items permanently attached to its structure. ("Permanent" means anything that would not fall out if you turned the building upside down.) Up to 10 percent of your policy's value for building coverage may apply to a detached garage or carport on the same lot.

  Damage to the basement foundation is a major problem, so this coverage can be very important, although it does not cover the finished portions (rugs, furniture, wallpaper, etc.) of a basement. Some private companies sell coverage for water damage caused by sewer backup or sump pump failure, which NFIP does not cover.

- Contents Coverage. This insures your personal property, including clothes washers and dryers, food freezers, and the food in them. It is available to renters as well as owners, even if your home is not insured under the NFIP. It pays some costs to move and store contents in a safe place when a flood threatens.

NFIP flood insurance is sold through private insurance agents and companies. All policies offer identical coverage and rates. A few private insurance companies sell their own flood insurance policies. Their coverage and rates vary and are different from the NFIP's. Some manufactured home insurance covers flood losses.

For information about flood insurance and the NFIP, you may

- call 1-800-427-4661 to find out if your community is participating in the NFIP
- visit FEMA's web site *www.fema.gov/nfip*
- call the NFIP's toll-free number, 1-888-call-flood, ext. 445, to get the name of a local agent
- call your insurance agent about coverage and rates. Ask if you are eligible for a Preferred Risk Policy, which has especially low premiums. Be sure to get clear answers about exactly what the policy includes and excludes so you can be sure you have appropriate coverage. For example, is damage from rain blown in through a broken window or door covered?

The National Flood Insurance Program (NFIP)

Some Myths and Facts About Flood Insurance and the National Flood Insurance Program

Myth: Federal disaster aid, available during and after a flood, will reimburse me for losses. Therefore, I don't need to buy flood insurance for my home and belongings.

FACT: Federal Emergency Management Agency disaster aid is available only during Presidentially declared disasters, which are less than 50 % of flooding incidents.

Myth: *There is almost no chance my house will be flooded.*

FACT: Everyone has some a flood risk. In the last few years, floods have hit homes in all 50 states. Floods are caused by storms, melting snow, hurricanes and water backup due to inadequate or overloaded drainage systems, dam or levee failure, etc.

Myth: Only residents of high-flood-risk zones need to insure their property.

FACT: Up to 25% of the NFIP's claims come from outside high flood-risk areas. The NFIP's Preferred Risk Policy, available at a very low rate, is designed for residential properties located in low to moderate-flood-risk zones.

Myth: I can't buy flood insurance because my home was flooded previously.

FACT: If your community is participating in the NFIP, it doesn't matter that your home has been flooded before. You may still buy flood insurance.

Myth: I can't buy flood insurance if my home is located in a high-flood-risk area.

FACT: The Program was created in 1968 to provide flood insurance to people living in areas with the greatest risk of flooding.

Myth: Flood insurance is very expensive and not worth the cost.

FACT: You could lose everything in a flood. If the flood is part of a Presidentially declared disaster, you may receive a grant. Flood insurance always reimburses you for all covered losses, whether or not a disaster is declared. Claims are handled quickly to speed your recovery. You may request a partial payment immediately so you can start recovering faster.

Myth: If a flood is predicted in the near future, it's too late for me to purchase insurance.

FACT: In a participating community, you can purchase flood insurance anytime. However, before the policy is in effect, there is a 30-day waiting period after you have applied and paid the premium. The policy will not, however, cover a loss in progress.

[home | feedback | library | privacy policy | search | site help | site index

Site Index
About the NFIP
Ask the Expert
News & Updates
Flood Insurance Library
Storm Watch
Project Impact
Mitigation
Information for Consumers
Information for Insurance Agents
Information for Insurance Companies
Information for Lenders
Information for State & Local Officials
Search the NFIP Site
NFIP Home

Cost Information

The average cost for an annual flood insurance policy, as of April 30, 2000, is $353. This average was derived from the number of policies in force by the amount of written premium. The average amount of flood insurance coverage purchased, as of April 30, 2000, is $124,089.

Depending on where you live and the coverage you choose, flood insurance can cost just a little over $100 a year through the Preferred Risk Policy.

There are a number of factors are considered in determining the premium for flood insurance coverage. They include:

- amount of coverage purchased
- location
- age of the building
- building occupancy
- design of the building
- for buildings in Special Flood Hazard Areas, elevation of the building.
- buildings eligible for special low-cost coverage at a pre-determined, reduced premium rate are single-family and 1-4 family dwellings located in zones B, C, & X. Ask your insurance agent if you're eligible for a Preferred Risk Policy.

- Cost & Coverage
- Cost Comparision for $50,000 coverage
- Premium Examples for a $100,000 home
- Preferred Risk Policy Premiums

Updated: July 24, 2000

Cost and Coverage Data as of May 1, 2000

Occupancy Type	Regular Program	
	Coverage	Premium*
Single family	$124,300	$570
Two to four family	$101,700	$524
Other residential	$85,900	$665
Non-residential	$218,600	$1,514

***** *Premium values are based on Pre-FIRM Special Flood Hazard Area rates and includes Federal Policy Fee & Expense Constant. Premium does not include ICC premium.*

Updated: July 24, 2000

Federal Emergency Management Agency

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

A $50,000 Flood Damage Repair Cost Comparison

With Flood Insurance	Without Flood Insurance
$100,000 Coverage	$0 Coverage
$50,000 Flood Damage	$50,000 Flood Damage
− $1,000 Deductible	+ $3,732 Annual Disaster Loan Payment
$49,000 Total Claim Benefit	Or
− $352 Average Annual Premium	$311 Per Month ($50,000 SBA Loan @ 4% interest for 20 yrs)
$48,648 Net Benefit	$3,732 Net Cost
$352 Per Year	$3,732 Per Year

As of January 31, 2000, the average premium for all policies in force is $352. Average coverage is $123,643. Flood insurance premiums can be as low as $106, based on your flood risk and the coverage you choose.

Updated: May 25, 2000

Premium Examples For A $100,000 Single Family Home

If you own a home in a community that participates in the National Flood Insurance Program, you are eligible for flood insurance. More than 19,000 communities participate, so its likely that your community does participate.

There are many factors that affect the price you'll pay for flood insurance. The higher your flood risk, the higher the premium. If you purchase $100,000 in building coverage for your home, your annual premium will vary depending on the area in which you live.

- If the property is located near the ocean and therefore subject to storm surge and hurricane damage, your building is most likely in a V Zone. Premiums is V zones can be more than $1,000 annually because your home is in the highest risk area.
- If the property is located near a river, lake or stream, your building is probably in an A zone. Premiums in A zones can be about $595 annually because of the high potential for flooding.
- If the property is located in a low-risk area, referred to as B, C, X or A99 zones, your premium could be as low as $306 annually using standard rates. You may also be able to get the Preferred Risk Policy. Click here for premium rates for the PRP.

Below are annual premiums for $100,000 of flood insurance coverage for a residential single family home:

Pre or Post-FIRM	Zone	Other Rating Factors	Premium
Pre-FIRM***	Zone V1-30,VE	No Enclosure	$845.00****
		With Enclosure	$1,090.00
Post-FIRM***	Zone V1-30,VE	At BFE*	$ 850.00
	Built between 1975-1981	1 Foot below BFE	$ 2,180.00
Pre-FIRM	Zone A1-30, AE	No Basement	$ 595.00

		With Basement	$ 700.00
Post-FIRM	Zone A1-30, AE	At BFE	$ 431.00
		1 Foot above BFE	$ 301.00
		1 Foot below BFE	$ 1,251.00
Pre-FIRM	Zone AO, AH	With Certification**	$ 201.00
		Without Certification	$ 585.00
Pre/Post-FIRM	Zone B, C, X, A99	No Basement	$ 351.00
		With Basement	$ 441.00

**BFE-Base Flood Elevation found on Flood Insurance Rate Map*

***Certification is determined by an Elevation Certificate completed by a licensed engineer, surveyor or architect*

****Pre/Post FIRM is determined by the date of the initial Flood Insurance Rate Map*

*****Premium values are based on total written premium plus Expense Constant, Federal Policy Fee and Increased Cost of Compliance premium. Effective date: May 1, 2000*

Updated: July 6, 2000

Federal Emergency Management Agency

Preferred Risk Policy Premiums

If your single family home is located in a low–risk area, which is a B, C, or X zone on the current flood insurance rate map for your area, you may be eligible for the Preferred Risk Policy. This policy covers both your home and contents with one premium, which can be as little as $106 a year.

Preferred Risk Premiums

Building with a Basement

Coverage Amount	Contents	Premium
$ 20,000	$ 5,000	$131
$ 30,000	$ 8,000	$156
$ 50,000	$12,000	$196
$ 75,000	$18,000	$221
$100,000	$25,000	$246
$125,000	$30,000	$261
$150,000	$38,000	$276
$200,000	$50,000	$306
$250,000	$60,000	$326

Building without a Basement

Coverage Amount	Contents	Premium
$ 20,000	$ 5,000	$106
$ 30,000	$ 8,000	$131
$ 50,000	$12,000	$171
$ 75,000	$18,000	$196
$100,000	$25,000	$221
$125,000	$30,000	$236
$150,000	$38,000	$251
$200,000	$50,000	$281
$250,000	$60,000	$301

Building deductible $500 and Contents deductible $500 applied separately. Premium includes Federal Policy Fee and Increased Cost of Compliance premium. Effective date: June 1, 1998

Preferred Risk Policies (PRP) are only available for owners of 1-4 family residential buildings. Additionally should any of the following conditions apply to your home, based on its flood history regardless of ownership, a PRP cannot be written: *

- 2 loss payments, each more than $1,000
- 3 or more loss payments, regardless of amount
- 2 Federal Disaster Relief payments, each more than $1,000
- 3 Federal Disaster Relief payments, regardless of amount
- 1 flood insurance claim payment and 1 flood disaster relief payment (including loans and grants), each more than $1,000

If your home is in a low-risk area, and one or more of the above conditions apply or you own a building other than a 1-4 family home that is located in a

B, C, or X zone, you can still purchase flood insurance at the low-risk Standard Rates. Premium examples for $100,000 of coverage for a single-family home.

*Contact your insurance agent for all the eligibility requirements for a PRP.

Updated: July 24, 2000

Federal Emergency Management Agency

Federal Emergency Management Agency (FEMA)

NATIONAL FLOOD INSURANCE PROGRAM

MIRACLE PAINKILLING POWER OF COPPER JEWELRY

Beat arthritis & other agony forever!

Sun $1.29/$1.39CANADA April 8, 1997

As Bible predicts: The Hale-Bopp comet will trigger

NEW FLOODS MENACE

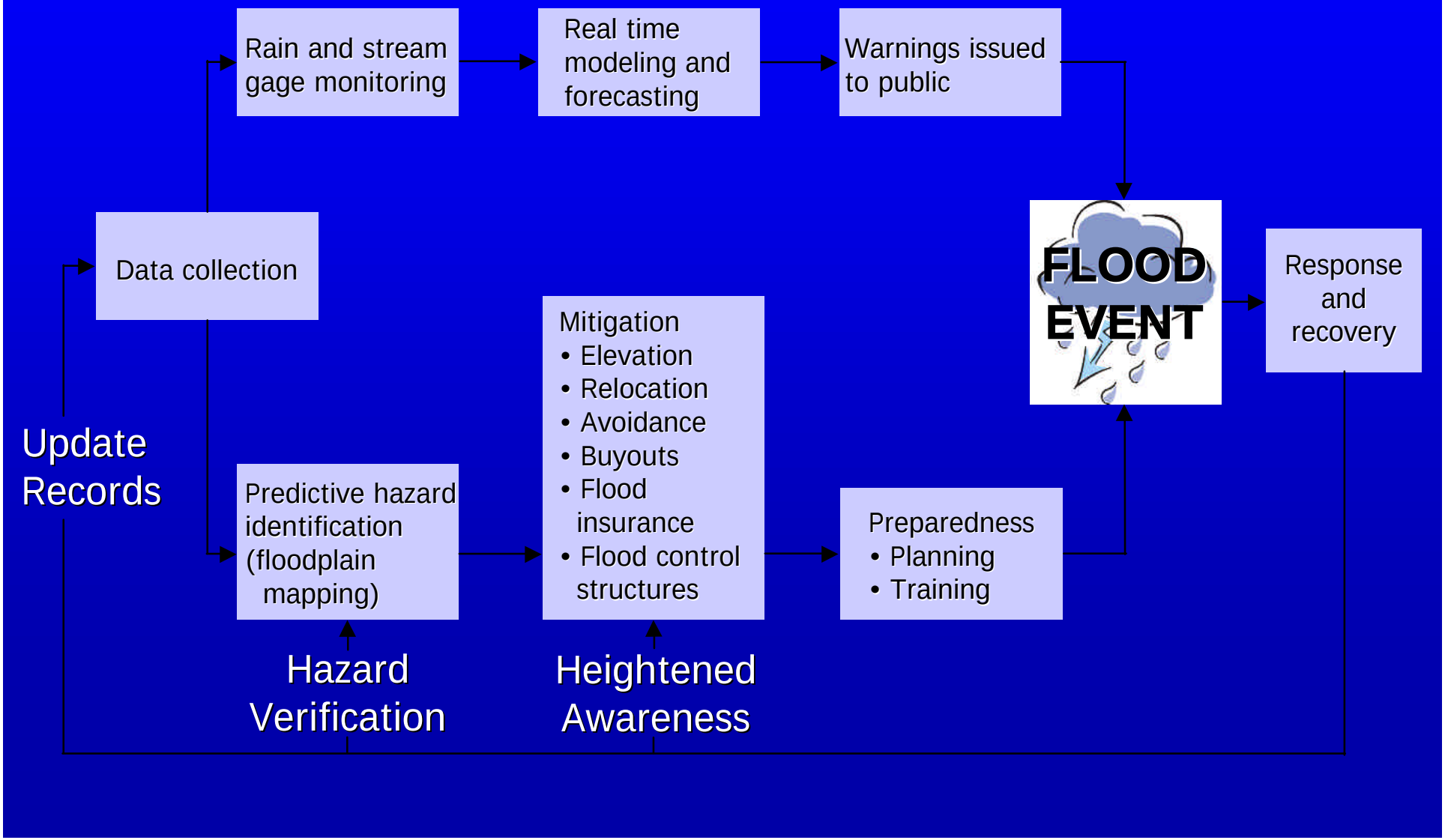
YOU'VE BEEN WARNED!

WORST IS YET TO COME

Thousands to die in low-lying areas from century's stormiest spring & summer

$1.29 / $1.39 Canada 14 0 70692 06715 2

Flood Disaster Cycle



NFIP Overview

Purposes:

- Make flood insurance available
- Identify floodplain areas and flood risk zones
- Provide framework for floodplain management regulations

Federal Emergency Management Agency (FEMA)

- Builds and supports U.S. emergency management system
- Coordinates the Federal Response Plan
- Administers the National Flood Insurance Program (NFIP)
- Coordinates preparedness, training, exercises at Federal, State, and local levels
- Administers the Public Assistance Program
- Encourages mitigation through:
  - NFIP
  - ***Project Impact***
  - Community Rating System
  - Hazard Mitigation Grant Program

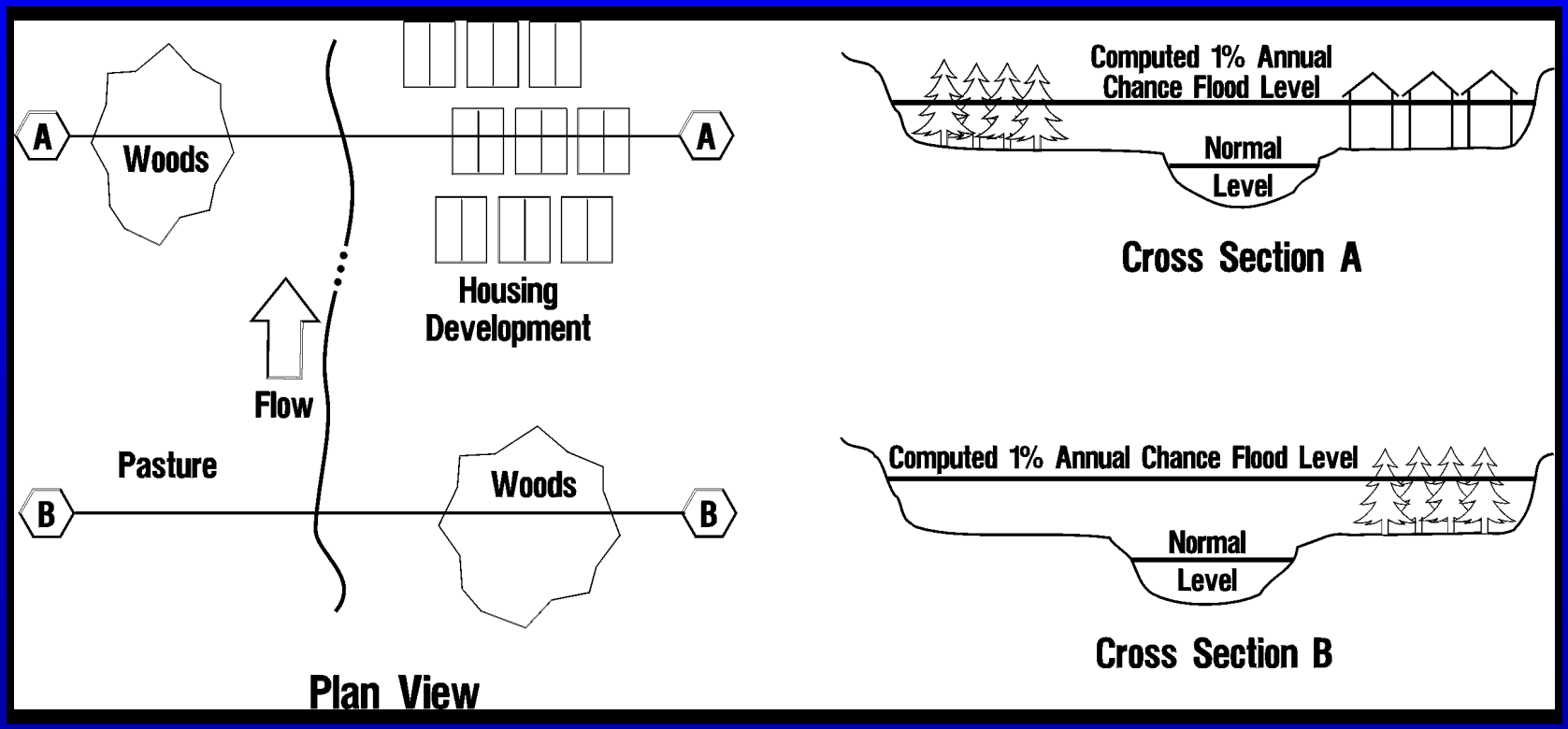
FEMA's Flood Mapping Program

Special Flood Hazard Area (SFHA)

The area that has a 1%, or greater, chance of being inundated in any given year

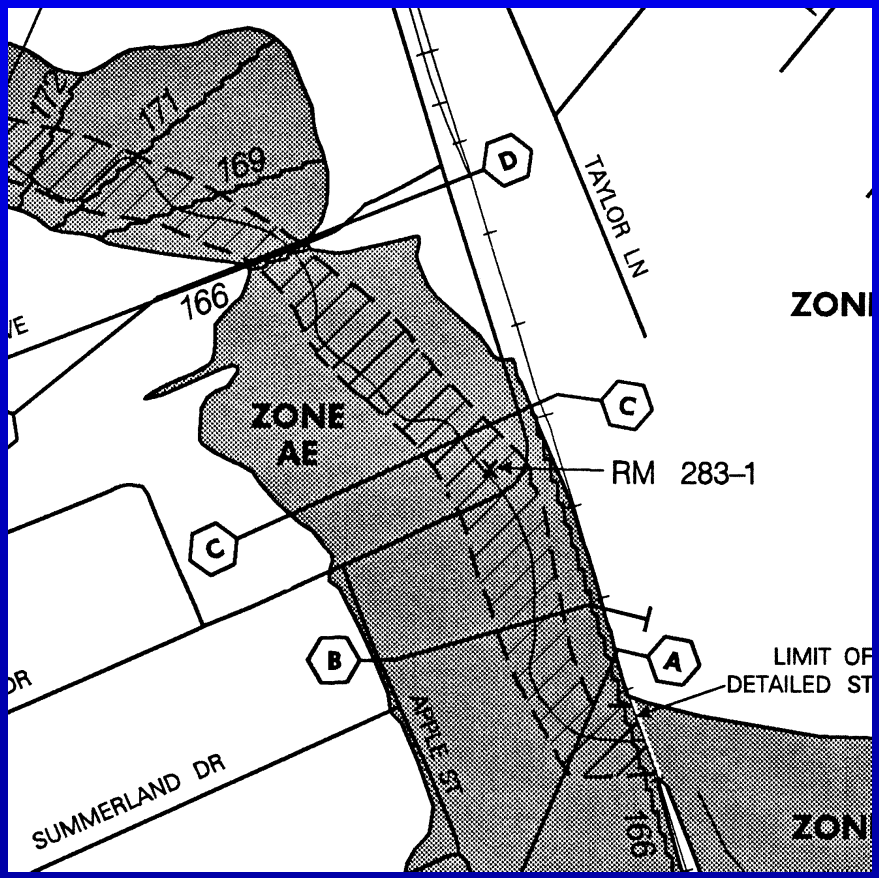
Components of Flood Insurance Study

Hydraulic Analyses

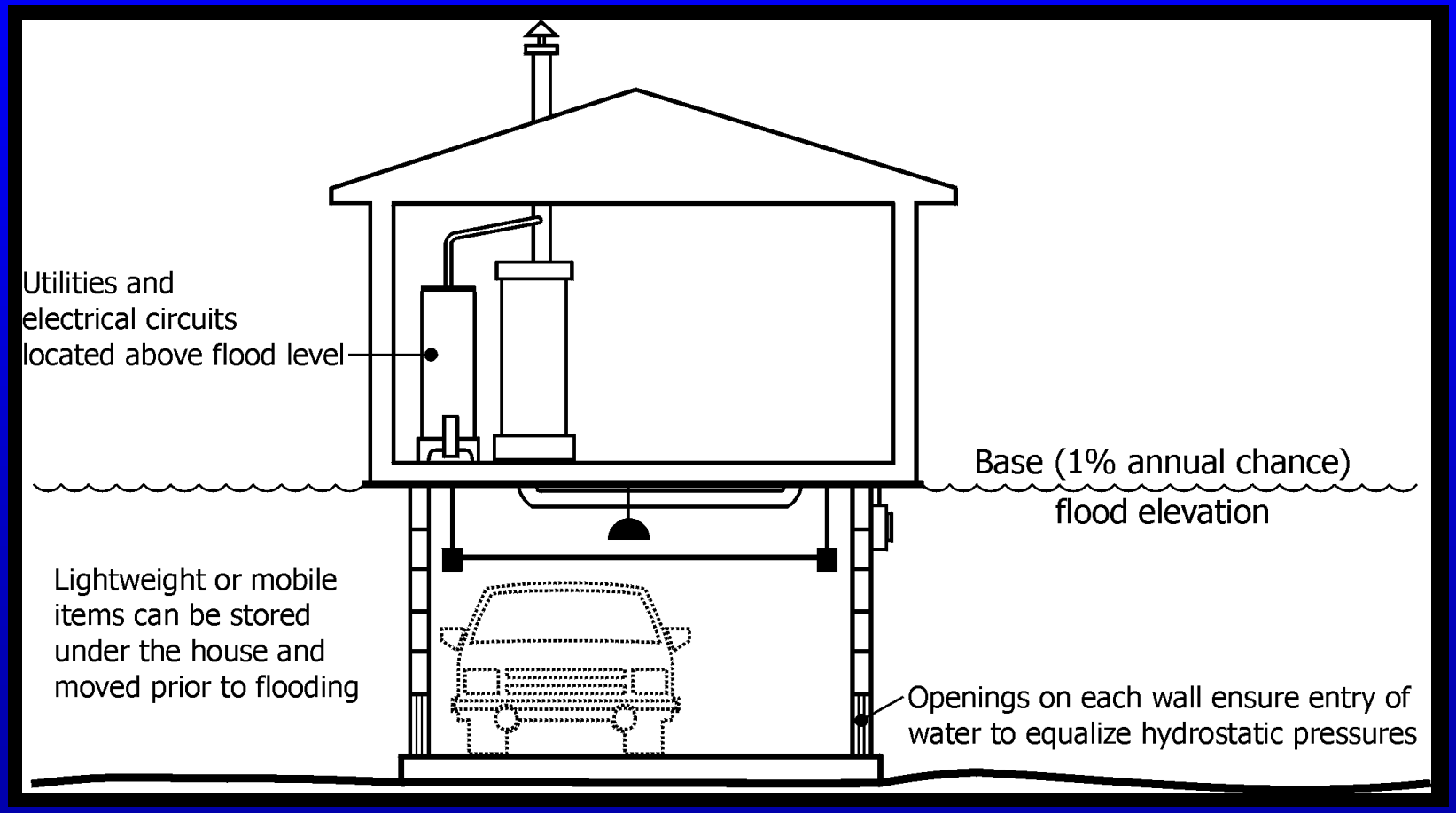


NFIP Overview

- Identify floodplain areas and flood risk zones
  - Over 100,000 map panels for approximately 20,000 communities
  - Over 100 million acres of floodplain mapped
  - Approximately 6 million acres of floodway along 40,000 stream/river miles

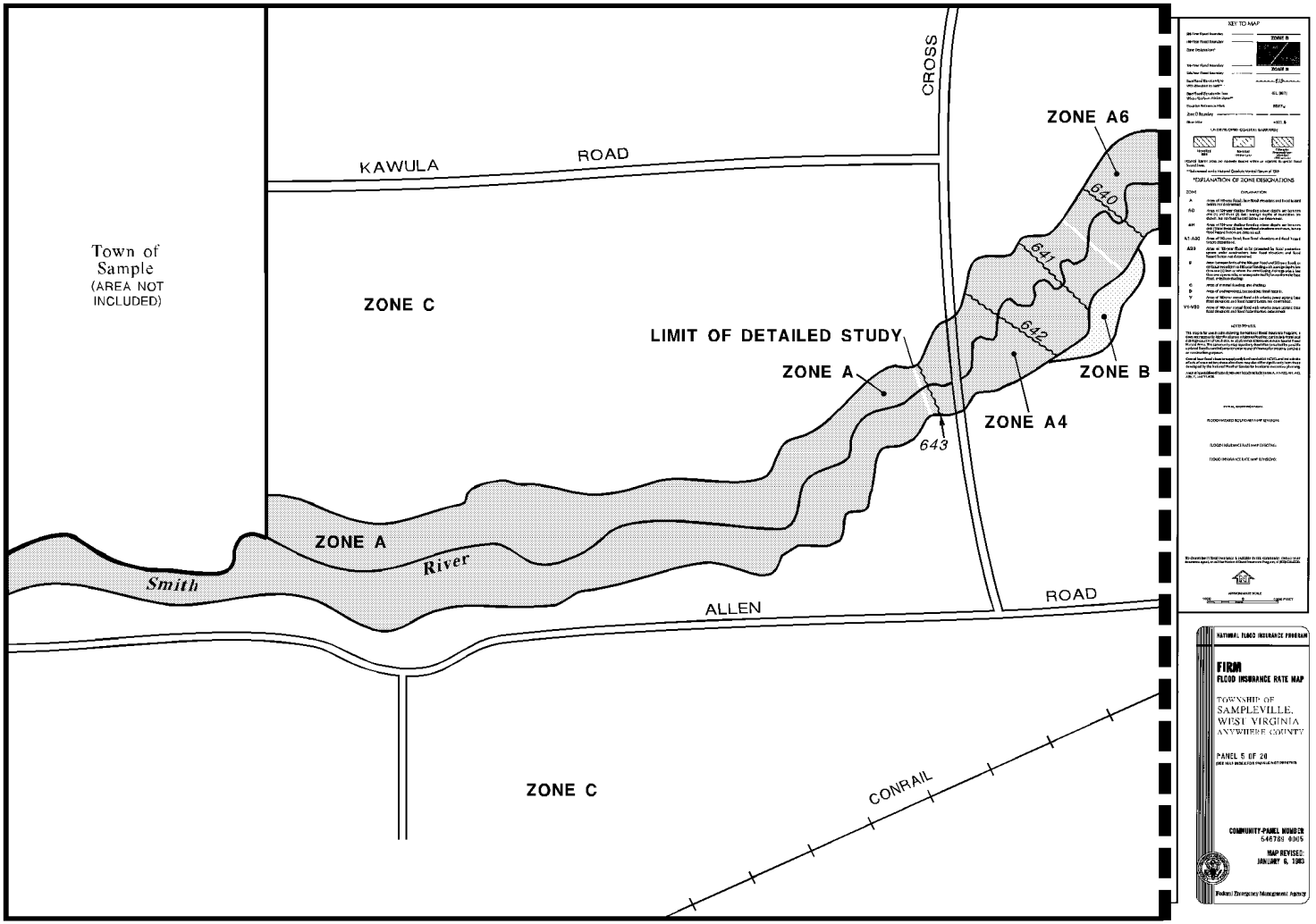


NFIP Overview



Elevation requirements for residential structures

Flood Insurance Rate Map



(Enlarged view of portion of map)

Project Impact

Building Disaster Resistant Communities

- FEMA's top priority
- Designed to break the disaster-rebuild-disaster cycle
- Helps communities become disaster resistant through:
  - Mitigation
  - Planning
  - Partnership building
- Emphasizes private sector involvement

Americorp volunteers and FEMA use GPS system to determine possible flood areas along Elkins, West Virginia rivers.

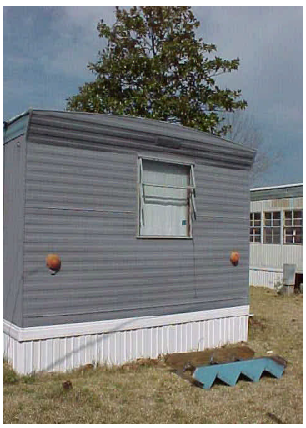
Appendix G : Case Studies

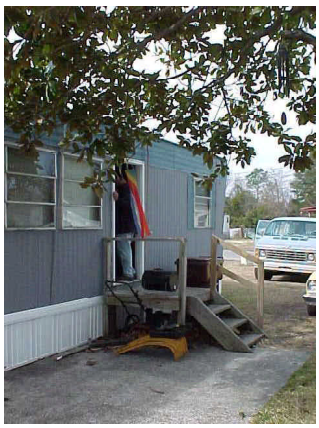
Case Study 1 – Manufactured Home

Case Study 2 – Single Family Home

Case Study 1 – Manufactured Home

Unit Type: Single-Wide Manufactured Home
Client Address: Wilmington, New Hanover County, NC





Introduction to the Case Study

A young couple with one child who own and reside in the home filed an application for the Weatherization Assistance Program (WAP). After the application was approved, a Weatherization Inspector visiting the home in February 2000 performed a series of inspections which focused on opportunities for both weatherization and hazard mitigation. This Case Study documents the inspections, the identification of opportunities for improvement and final recommendations. It illustrates the integration of the weatherization and hazard mitigation inspections and the decision making process used by an Inspector after receiving Hazard Identification & Mitigation (HI&M) training.

Description of the Home

The client lives in a 1966 single-wide manufactured home consisting of a living room/kitchen combination, two bedrooms and one bath. It is located in a dedicated mobile home park with water, sewer and electrical underground utility hook-ups. A paved road provides access to the home and the park includes trees and vegetation. There is a system of drainage ditches to channel stormwater away from the homes.



Identification of Weatherization Opportunities

On arriving at the home, the Inspector introduced himself to the clients and made sure they were aware of the purpose and goals of the WAP. Then he performed a simple review of the exterior and interior of the structure as a whole to ensure that the home conformed to program guidelines. The review included sketches and measurement of the home's layout. The unit was found to be structurally sound, so investment of funds to make the home more energy efficient was justified.

The Inspector then used a standard blower door test to evaluate the "air tightness" of the home. The test is designed to indicate if the home has air leaks that allow heat to escape and make the home less energy efficient. The home scored as follows:

Current Blower Door Reading: 2,800 cfm
Desired Blower Door: 1,500 cfm

The blower door test results indicated the home had considerable air leakage. Leakage was found around the front door frame, where the original door had been replaced and around the second door that was improperly sized in a poorly fitted frame.

Broken and missing windows in the home also made a significant contribution to the poor blower door readings.

The Inspector then examined the furnace and interior heating systems. The furnace was located in a central cupboard, was improperly installed and not in working condition. There was considerable air leakage around the unit, as well as leakage through an unsealed flue from the original furnace. The heating ductwork was also in extremely poor condition. Many of the vents were rusted through, and the clients had taped cardboard over them to try to reduce the cold airflow. It was determined that these ducts could not be used.

After completing the blower door test and furnace inspection, the Inspector decided that there were opportunities to use WAP funds to improve the energy efficiency of the home. Weatherization measures to stop air infiltration included the installation of doors and windows, and applying caulking, roof cement and



mobile home coating.

The Inspector then estimated the types and quantities of materials required to complete the Weatherization improvements to the home.

Weatherization Materials Listing:

1	Diamond Door
2	2x4x8 Treated Lumber
1	¾" Plywood
12	Mobile Home Windows
15	Caulking Tubes
1	Gallon of Roof Cement
48"	Door Casing
1	Pound of #6 Finishing Nails
2	5-Gallon Containers of Mobile Home Coating
8	Putty Tape Rolls
13	Boxes of Screws

Estimated Material Cost: $761
Estimated Labor Cost: $761 (1:1 materials to labor multiplier)

Heating Appliance Repair and Replacement Program (HARRP) Measures:

The client currently uses electric space heaters as their only heat source because the furnace is inoperable. The inefficiency of the space heaters, combined with the high air leakage, have led to extremely high monthly utility bills. Therefore, the Inspector recommended that the client receive a gas monitor space heater that will provide adequate, safe heating for the family.

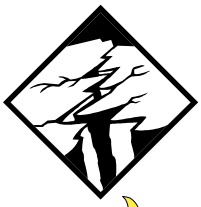
Projected Cost: $1,500.00 (Current CO Reading: 0 ppm)

Hazard Identification and Mitigation Measures:

Before going to inspect the home, the Weatherization Inspector determined the relative risk of flood, fire, wind and earthquake for the home. The Inspector found that the region of New Hanover County, NC is at some risk from all four hazards.

Flood - The Flood Insurance Rate Map showed that the home is in an unshaded Zone C, an area outside the 500 year floodplain. The Inspector noted that because the home dated from 1966, before current FEMA standards were established, the consequences of flooding might be severe. He also noted that the area is susceptible to localized flooding from hurricanes. The FIRM suggested a low risk of flooding from riverine or coastal flooding, and the Inspector decided to check the localized chance of flooding during the inspection.

Wind – The Wind Zones in the US map clearly shows New Hanover County to be in the orange, Zone III region. It also showed the Inspector that the area is subject to hurricanes. The Inspector decided that this hazard posed a major threat and assessed the risk at medium high.



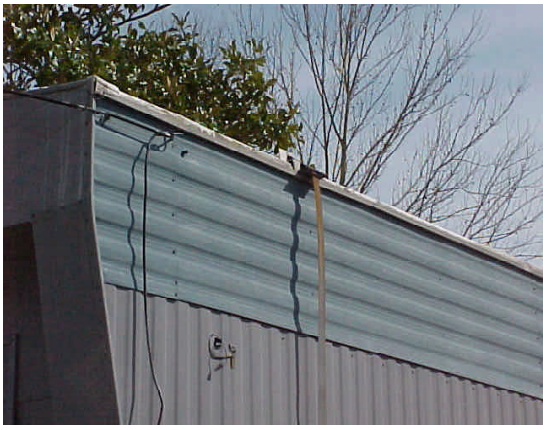
Earthquake – The National Map of Earthquake Zones suggests that New Hanover County is in a moderate risk area. Deciding to investigate this further, the Inspector reviewed the more detailed map of North Carolina. It showed that the most of New Hanover County was in the blue or low medium risk area.

Fire – The Inspector then consulted the Map of Fire Risk. By examining the fire risk on a monthly basis, the Inspector determined that New Hanover County has a fire score of 7 which makes it at moderate risk for fire.

In summary, before the Inspector had even visited the site, the relative risks from these four natural hazards had been assessed and prioritized as wind, fire, earthquake and flood. During training, the Inspector had also been informed of additional programs and resources to maximize the benefits to the client.

As the Inspector approached the property to perform his initial assessment for conformity to weatherization program guidelines, he noticed the grading around the home. The land is flat and may be susceptible to flooding from heavy hurricane rainfall. The Inspector observed a large stormwater ditch behind the home that was generally clear of obstructions, so he was satisfied that the home had a low risk of flooding. Also, as in most manufactured homes, the base of the unit was installed two feet above ground level.

After introducing himself to the clients, the Inspector performed an exterior evaluation of the home. The inspection included drawing a plan of the structure and identifying window sizes and styles. This time was the perfect opportunity to review the exterior of the home for hazard mitigation



opportunities. The review focused on the higher risk wind hazard and included checking whether the mobile home was properly strapped and anchored. The home had standard "over the top" style straps, but a number of them were not adequately secured and were loose when pulled by hand.

The Inspector looked under the home to inspect the anchoring of the straps to the frame of the home and to the ground. The anchoring was adequate and used standard ground anchors that were appropriate for the conditions expected.

The exterior surface sheathing of the home was noted as being in fair condition. The doors and windows were noted as poor from a hazard mitigation perspective but would probably be replaced as part of the WAP. Most of the property was free and clear of debris. During the weatherization process excess building materials and debris would be removed from the property, in order to further reduce the potential for windborne debris.

When the Inspector moved to the interior of the home and performed the standard blower door test, he walked through the mobile home looking for air leaks. During this process he also assessed the interior of the home for potential hazards. Although earthquake was a low medium risk, he noted that the interior did not include many overhead cupboards, free standing furniture or other heavy elements that could break free or topple during an earthquake.

The Inspector did notice, however, that there were no operating smoke or carbon monoxide detectors in the home. Although the risk of fire outside the home was reduced by a noticeable gap or fire break between homes and a lack of debris, the interior was at risk. The Inspector made a note to install smoke and carbon monoxide alarms, hard-wired with battery back-up.

While performing a review of the furnace and interior heating systems, the Inspector observed the poor furnace installation. As part of the HARRP program the Inspector recommended installing a gas-fueled heating system that would include gas tanks outside the home. Although this potential hazard was not present at the inspection, the Inspector saw a potential for leveraging his funds from HARRP, WAP and HI&M. The Inspector recommended that while the certified gas installer was putting the heating system in place that he also install a gas safety cut-off valve on the fuel line. The cut-off valve would reduce the risk of gas leakage if there were a break from wind, flood or earthquake. In addition, the gas tanks themselves should be elevated and strapped.

After concluding the inspection, the Inspector estimated the types and quantities of materials required to complete the Hazard Mitigation improvements to the home.

Hazard Mitigation Materials Listing:

2	Smoke & Carbon Monoxide alarms
1	Gas Safety Cut-Off Valve
4	2x4x8 Treated Lumber – for raising the gas tanks & interior furnace
2	1x4x10 Treated Lumber – for bracing the gas tanks & interior furnace
1	¾" Plywood– for raising the gas tanks & interior furnace
1	Reattachment of Anchoring Straps

Estimated Material Cost: $300
Estimated Labor Cost: $300 (1:1 materials to labor multiplier)

The Inspector successfully integrated the WAP and HI&M inspections and recommendations. He used HI&M training to evaluate the relative risks of the hazards and match them against conditions at the property. The Inspector made recommendations of mitigation measures to directly reduce the particular risks at the home and combine program resources to maximize the benefits for the client.

Case Study 2 – Single Family Home

Unit Type: Single Family, Wood-Frame Home
Client Address: Wilmington, New Hanover County, NC

Introduction to the Case Study
An elderly homeowner filed an application for the Weatherization Assistance Program (WAP). After it was approved, a Weatherization Inspector visiting the home in February 2000 performed a series of inspections which focused on opportunities for both weatherization and hazard mitigation. This Case Study documents the inspections, the identification of opportunities for improvement and final recommendations. In particular, the Study illustrates the integration of the weatherization and hazard mitigation inspections and the decision-making process an Inspector uses after receiving Hazard Identification & Mitigation (HI&M) training.

Description of the Home
The client's home is a small, wood-frame unit consisting of four rooms and one bathroom. Four people reside in this home including an elderly person and children. The home is located near a main highway and access to is provided along 800 yards of poorly maintained dirt road. There are telephone and electricity hook-ups, but water comes from a well on the property. Sewage goes to a drain field. The area around the home is heavily wooded with light vegetation at grade level adjacent to the home.

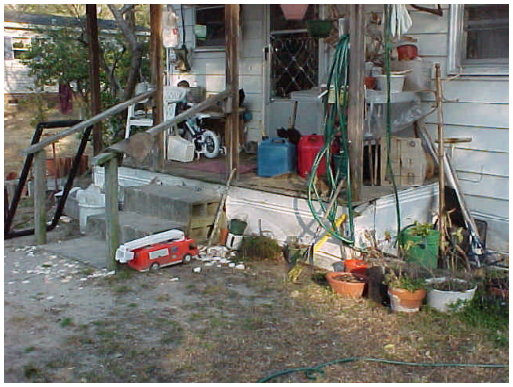
Identification of Weatherization Opportunities
On arriving at the home, the Inspector introduced himself to the client and made sure she was aware of the purpose and goals of the WAP. Then he performed a basic review of the exterior and interior of the overall structure to ensure that the home conformed to program guidelines. The review included sketches and measurement of the home's layout. The unit was found to be structurally sound, except for a portion of the roof. Most of the roof sheathing consisted of wood boards running the length of the house and was found to be in fair condition. However, in one corner, the fascia board had rotted and part of the eave was missing, and, in another corner, the eave was badly damaged from rot and weathering. There was no insulation, and the missing eave created a large gap between the roof and wall.

The Inspector noted that this portion of the roof needed replacement. Although replacing the damaged portion of the roof would be more than the WAP alone could fund, weatherization by installing insulation would be useless without it. Also, from a risk mitigation standpoint, the Inspector realized that if the eave was not repaired, winds could blow up and into the roof space during a future hurricane. This action could accelerate the roof damage and potentially destroy the entire home. Therefore, it was in the best interests of the homeowner, WAP, and HI&M to repair the roof.

When the Inspector examined the inside of the home, he found that the door to the plastic-enclosed porch area was permanently open, so the energy efficiency of the home was further reduced. The Inspector decided to install doors on the porch and reduce air infiltration. The Inspector also recommended that attic insulation be installed. To help eliminate air infiltration, he further recommended applying minor glazing, caulking, and roof cement. The Inspector estimated the types and quantities of materials required to make the weatherization improvements to the home.

Weatherization Materials Listing:

2	6-Panel Doors
2	Peep Holes
2	Door Lock Combinations
3	Pairs of Hinges
2	2-Piece Thresholds
2	Weather Strip Sets
1	2x6x8 Treated Lumber (For eave)



15 Caulking Tubes
8 Glazing Tubes
1 Gallon of Roof Cement
1 Foam Tape Roll
1 #8 Nails (Pound)
1 Storm Door Closure
1 Insulation for 20x26 Attic (use R rating appropriate to local codes)

Estimated Material Cost: $650
Estimated Labor Cost: $650 (1:1 materials to labor multiplier)

Heating Appliance Repair and Replacement Program (HARRP) Measures:

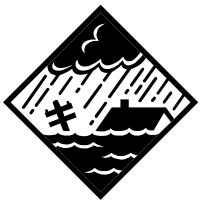
When the Inspector examined the furnace and interior heating systems, he found the client used unvented kerosene heaters as the sole heat source. The inefficient heaters were expensive to operate and were a safety hazard. Therefore, the Inspector recommended that the client receive a gas space heater to provide adequate, safe heating for the family.

Projected Cost: $1,200.00
(Current CO Reading: 92 ppm)

Hazard Identification and Mitigation Measures:

Before going to inspect the home, the Weatherization Inspector determined the relative risks of flood, fire, wind, and earthquake to the home. The Inspector found that the region of New Hanover County, NC is at risk from all four hazards.

Flood - The Flood Insurance Rate Map showed that the home is in an unshaded Zone C, an area outside the 500-year floodplain. The Inspector noted that because the home dated from 1966, before current FEMA standards were established, the consequences of flooding might be severe. He also



noted that the area is susceptible to localized flooding from hurricanes. Therefore, although the FIRM suggested a low risk of flooding from riverine or coastal flooding, the Inspector decided to check the chance of localized flooding while he was doing the inspection.

Wind – The Wind Zones on the U.S. map indicates that New Hanover County lies in the orange, Zone III region. It also shows the Inspector that the area is at risk for hurricanes. Taken together with the fact that there are numerous large trees nearby that could fall on the home, the Inspector decided that this hazard posed a significant threat, and so, assessed the risk at medium high.

Earthquake – The National Map of Earthquake Zones suggests that New Hanover County is in a moderate risk area. Upon further investigation, the Inspector reviewed a more detailed seismic map of North Carolina, and concluded that most of New Hanover County was in the blue or low medium risk area.

Fire – The Inspector then consulted the Map of Fire Risk. After calculating the fire risk on a monthly basis, the Inspector determined that New Hanover County has a fire score of 7 which makes it at moderate risk for fire.

In summary, before the Inspector had even visited the site, he had assessed the relative risks of these four natural hazards and prioritized them in order as wind, fire, earthquake, and flood. During training, the Inspector had also been informed of additional programs and resources to maximize the benefits to the client.

As the Inspector approached the client's property to perform his initial assessment for conformity to Weatherization program guidelines, he also noted the grading around the home and the type of soil. Although the terrain is flat and appears to be susceptible to flooding from heavy hurricane rainfall, the soil is very loose and sandy. Conversations with the homeowner confirmed that the area drained very quickly because of the soil characteristics and there had been no flooding in living memory. Therefore, the Inspector was satisfied that flooding was indeed a lower risk for this home.

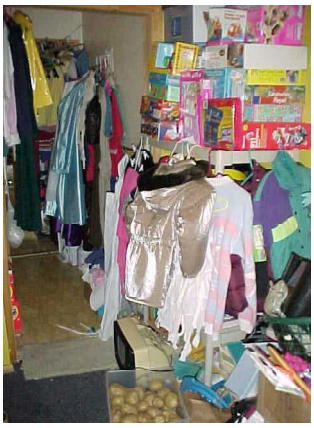
As mentioned previously, the Inspector first performed an exterior evaluation of the home. The evaluation included drawing a plan of the structure and identifying the window sizes and styles. At the same time, he examined the exterior of the home for hazard mitigation opportunities. Consistent with his focus on the higher risk wind hazard, the Inspector noted the need for roof repairs.

The exterior of the home appeared to be anchored properly to the ground and the side sheathing was in fair condition. The doors and windows were

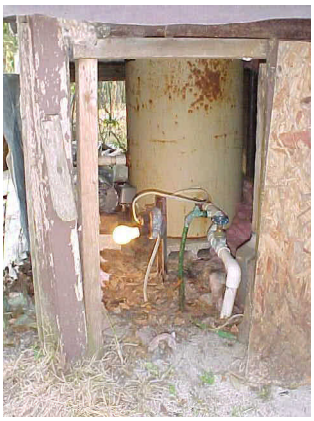
noted as poor from a wind-risk mitigation perspective but would probably be replaced as part of the WAP. There was little to no debris on the property.

When the Inspector moved to the interior of the home and performed the standard blower door test, he walked through the single family home looking for air leaks. During the test, he also assessed the interior of the home for other potential risks. Although earthquake was a low medium risk, he noted that the interior included many stacked boxes that were at risk of breaking free or toppling during an earthquake.

The Inspector also noted that there were no operating smoke or carbon monoxide detectors in the home. Although the risk of fire outside the home was reduced by a noticeable gap or fire break between homes and a lack of debris, the interior was at risk. The Inspector recommended installing smoke and carbon monoxide detectors, hardwired with a battery back-up.



After examining the furnace and interior heating systems, the Inspector recommended installing a gas-fuelled heating system that would include gas tanks outside the home. Although this potential fire risk was insignificant, the Inspector saw the potential for leveraging his funds from HARRP, WAP, and HI&M. The Inspector recommended that while the certified gas installer was putting the heating system in place that he also install a gas safety cut-off valve on the fuel line. Doing so would reduce the risk of gas leakage if there were an interruption from wind, flood or earthquake. The tanks themselves should strapped in place at a minimum and also elevated if there are enough funds left.



After concluding the inspection, the Inspector estimated the types and quantities of materials required to complete the Hazard Mitigation improvements to the home.

Hazard Mitigation Materials Listing:

Replace damaged or missing portion of roof
Install Smoke and CO Alarms – hardwired with battery back-up
Install Gas Safety Cut-Off Valve on fuel line
Elevate and strap gas tanks

Estimated Material Cost: $900
Estimated Labor Cost: $900 (1:1 materials to labor multiplier)

The Inspector successfully integrated the WAP and HI&M inspections and recommendations. Without the roof improvements, weatherization would have not been possible. The Inspector made recommendations of mitigation measures to directly reduce the particular risks at this home and combine program resources to maximize the benefits for the client.